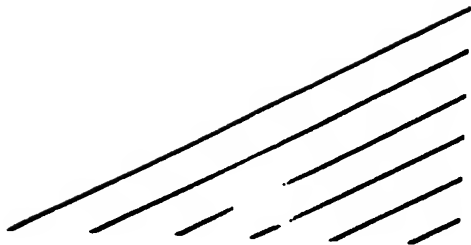


APPENDIX C

NORAND®
DATA SYSTEMS



4000 Series
Hand Held Computers

OPERATOR'S GUIDE

NPN: 961-028-048
January, 1990

4000 SERIES HAND-HELD COMPUTER Operator's Guide

Contents

EQUIPMENT	
General	5
Model Identification	6
Description	7
Options	8
CONTROLS	
General	10
OPERATIONS	
General	12
Main Battery Installation	12
NiCad Battery Pack	13
Alkaline Batteries	14
Power Up	15
Memory Protection	16
Optional Memory Card	17
Peripheral End cap Installation	17
Connections	18
ROUTINE OPERATION	
Daily	19
Low Battery Condition	20
HELP SECTION	
General	21
Trouble Chart	21
Repair Service	22
MAINTENANCE	
General	23
Main Battery, Backup Battery	23
Handstrap Replacement	24
Memory Card Battery	25
ROUTINE CARE	
Cleaning	26
SPECIFICATIONS	27

Warning

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class B computing device pursuant to subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a residential environment.

NOTICE

This document contains confidential information and is proprietary to Norand Corporation. It is being supplied to you with the express understanding that the information contained herein be held in confidence. This document is not to be copied, distributed, or displayed to third parties without the express written consent of Norand Corporation, and shall be returned to Norand Corporation upon written request. If a purchase, license, or non-disclosure agreement has been executed, the terms of that agreement shall govern this document.

Norand Corporation
550 Second Street S.E.
Cedar Rapids, Iowa 52401

®Trademark registered or applied for in countries of the world by Norand Corporation, Cedar Rapids, Iowa U.S.A.

©1989 Norand Corporation. All Rights Reserved.

EQUIPMENT

DO

DO make sure that the backup battery shipping insulator is removed on models 4400 and 4410.

DO ensure that batteries are fresh and properly installed.

DO charge a hand-held computer equipped with a NiCad battery pack when placing unit into service for the first time.

DO ensure that the hand-held computer remains securely connected to printers (or other devices) throughout printing or other operations.

DO use a soft cloth moistened with a quality glass cleaner to maintain the appearance of the hand-held computer.

DO remove the main battery for long term storage.

DON'T

Don't overtighten screws.

Don't use solvents or abrasive cleaners on the hand-held computer.

Don't use metal tools on the interior of the hand-held computer.

Don't use metal tools to grasp or handle delicate components such as the optional memory card.

Don't allow the main battery (or batteries) to remain in the computer for long term (30 days or more) storage.

GENERAL

Norand® hand-held computers are used in the route distribution industry to quickly and accurately record data entries and extend those into invoices, receipts, and other reports. Hand-held computers can also be found in warehouses, factories, and retail stores. Local utilities use them to record meter readings.

These units are battery-operated, making them extremely portable and well suited to route industries such as beverage, bakery, snack and dairy distribution operations. Programs or data can be loaded (or "downloaded") into the hand-held computer from a PC or mainframe. The built-in keyboard allows manual entries.

The hand-held computer typically contains a database with customer and product information. It performs calculations based on product movement, sends information to a printer, and is often used to send ("upload") data to a host (larger) computer.

MODEL IDENTIFICATION

Look on the label (beneath the handstrap) for the model number of your 4000 Series hand-held computer. You will find one of four designations: 4300, 4310, 4400, or 4410. The differences between models are shown below.

An option for all 4000 Series hand-held computers is a choice of 23 or 40-key keyboard.

	MODEL NUMBER			
	4300	4310	4400	4410

FEATURES

Processor Speed 4MHz 4MHz 8MHz 8MHz

Base Memory 256K 512K 512K 768K/1M

Display:
backlit
lines

Yes	Yes	Yes	Yes
4	4	4 std.	16
		16 opt.	

Nicad Battery

Optional

Battery Charging Capability

Yes	Yes	Yes	Yes
-----	-----	-----	-----

Memory Backup

Capacitor	Capacitor and Battery
-----------	-----------------------

Memory Card Capability

No	Yes	Yes	Yes
----	-----	-----	-----

Peripheral End Cap Option

Yes	Yes	Yes	Yes
-----	-----	-----	-----

DESCRIPTION

Figure 1 shows the basic 4000 Series hand-held computer. The computer features a display, a keyboard, and a high-impact thermoplastic case with a customer-replaceable handstrap. Notice the top (display end) of the hand-held computer; it is equipped with an end cap that can be removed. At the bottom of the hand-held computer is the battery compartment and the surface connector electrical contacts.

Display

On the front of the hand-held computer is a liquid crystal display (LCD) just above the keyboard. The 4-line display shows numbers, letters, and certain symbols. In addition, the optional 16-line display is capable of graphic presentations.

Keyboard-controlled backlighting makes the display more visible.

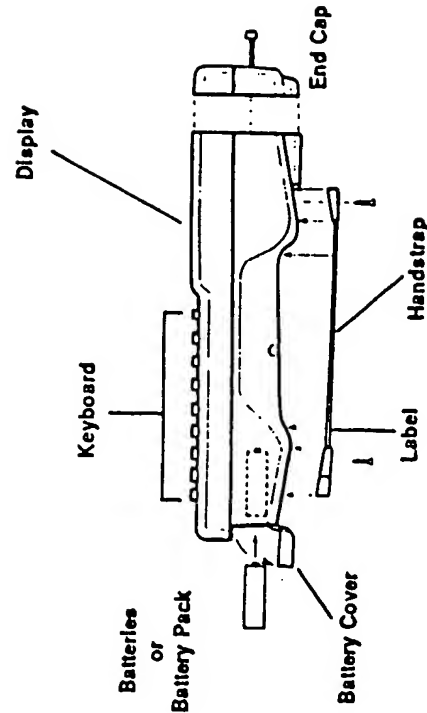


Figure 1
4000 Series
Hand-Held Computer

OPTIONS

All 4000 Series hand-held computers are available with either a 23-key or a 40-key keyboard. A peripheral end cap option is available for all models.

All models are designed to allow the use and recharging of an optional nicad battery pack.

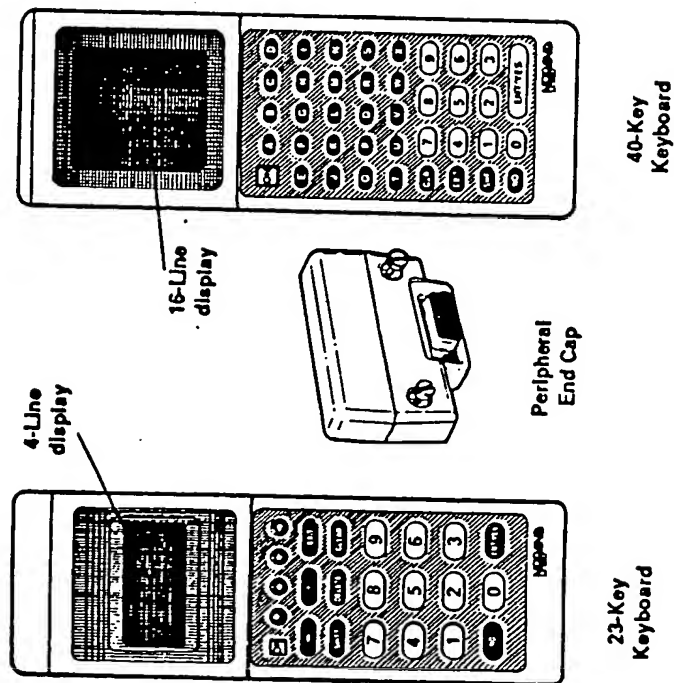


Figure 2
Options

Keyboard

Your hand-held computer can have either a 23-key (numeric) or a 40-key (alphanumeric) keyboard.

You will use the keyboard to make entries, changes or corrections, or for providing control input to the unit or to peripherals such as a printer or communication device.

Numeric keyboards (23-key) are widely used where speed is important and the user is not expected to make letter or word entries. To speed daily operations, these keyboards have UP/DOWN, LEFT/RIGHT scroll arrows in addition to large keys with the numbers zero through nine (0 - 9) conveniently arranged in a ten-key format.

Alphanumeric keyboards (40-key) have smaller keys labeled with 24 letters (the remaining two letters are achieved using the SHIFT key), and the numbers zero through nine (0 - 9) arranged in a standard ten-key format. With this keyboard, the user can easily make complete word entries or alter existing information.

Both keyboards activate the backlight when you press the SHIFT key and then the LIGHT key.

Peripheral End Cap

The end cap can be replaced with a peripheral end cap which is a type of adapter. The peripheral end cap makes internal electrical connections to the hand-held computer, and external connection to peripheral devices.

OPERATIONS

GENERAL

Unpack your new hand-held computer and inspect it for signs of physical damage that may have occurred in shipment or storage.

The information in this section tells you how to

1. install the main batteries
2. "power-up" the computer
3. activate the optional backup battery
4. install an optional memory card
5. install an optional peripheral end cap
6. connect to peripheral devices

MAIN BATTERY INSTALLATION

You must install the main batteries (or battery pack) before the hand-held computer will operate. Follow the instructions below to open the battery compartment and install batteries.

1. Slide the battery cover latches toward the outside of the hand-held computer.
2. Swing the battery cover downward to access the battery compartment.

Slide latches
outward

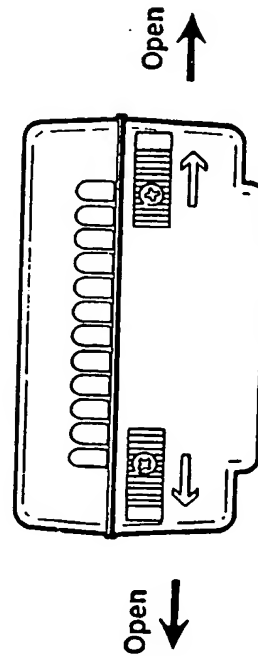


Figure 4
Battery Cover Latches

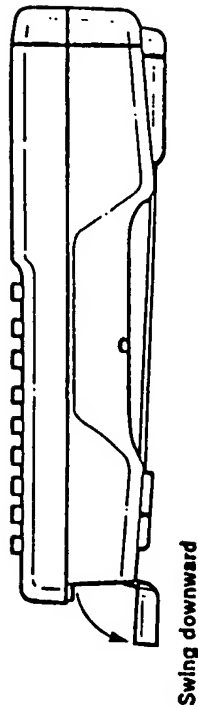


Figure 5
Open The Battery Cover

NiCad Battery Pack

If your unit is equipped with a NiCad battery pack:

1. Visually line up the rounded edge of the battery pack with the rounded side of the battery compartment opening.
2. The rectangular contact on the top of the battery pack goes into the battery compartment first.
3. Slide the battery pack into place.
4. Close the battery cover and slide both latches inward to lock the battery cover in place.

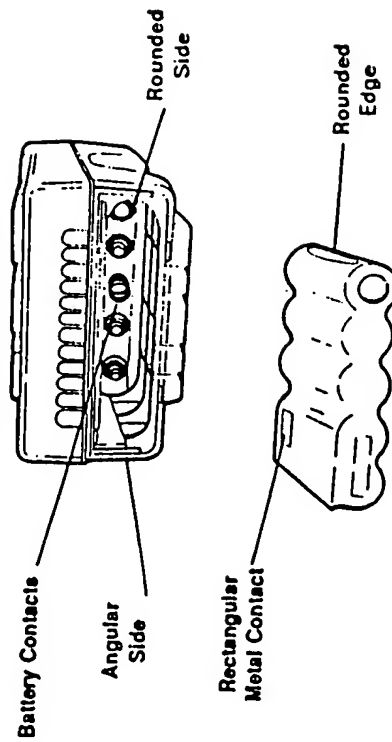


Figure 6
NiCad Battery Pack Installation

ALKALINE BATTERIES

Open the battery cover and follow the guidelines below when installing individual alkaline batteries (type AA). Reinstall the battery cover. Make sure it "snaps" into place.

- The small (button) end of a battery is normally the positive (+) terminal, which is often marked on the cell.
- The graphics on the underside ledge of the keyboard show how the batteries must go into the hand-held computer.
- Look into the battery compartment: the spring contacts are alternately large and small in diameter. Smaller springs contact the negative (-) battery terminals while the larger springs contact the positive (+) battery terminals.

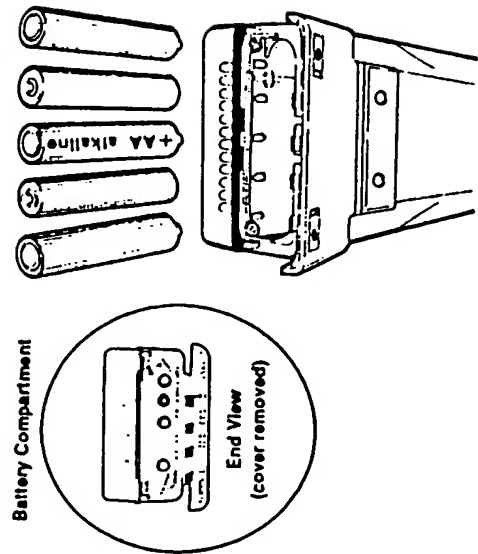


Figure 7
Battery Installation

POWER-UP

Follow the steps below to power-up the hand-held computer for the first time. The Basic Input-Output Information System ("BIOS") *must be enabled* for the hand-held computer to go to "sleep" (battery conservation mode) when not actually in use.

1. Press down on the key to the right of the ON key as you close the battery cover (a long "beep" sounds).
2. Release that key; the hand-held computer displays:

```
ROM BIOS  YMMDD
RAM LOAD  NNN
```

(the first line identifies the firmware date;
and the second line tells RAM size)

3. PRESS the ENTER key.
(This enables the BIOS).

If the first line of the screen displays 'REMOTE PGM LOAD' the hand-held computer has enabled the BIOS and is ready to receive a program from an external source.

In some cases the 'REMOTE PGM LOAD' display may not appear and you will need to follow steps 4 and 5, below, before it does display.

4. If the next display is 'RESUME?' press the NO key.
5. If the next display is 'SAVE DATABASE?' press the NO key.

MEMORY PROTECTION

Norand 4000 Series hand-held computers feature an internal capacitor (an energy-storing device) to help retain data in memory when the main batteries (or battery pack) are removed or become weak. Models 4400 and 4410 contain a lithium battery for additional protection against data loss.

Backup Capacitor

The backup capacitor is a passive (maintenance-free) device which is charged through normal operation of the hand-held computer. It will provide at least one hour of memory protection in the absence of main battery power.

Backup Battery

The lithium backup battery (models 4400 and 4410 - only) provides more than 30 days of memory protection in the absence of main battery power. It is disabled for shipping and storage by a small insulator; remove this insulator when you are ready to use the hand-held computer.

The backup battery shipping insulator sticks out from the display end of the hand-held computer, and bears the sentence:

"Remove Tab & Tighten Screws Before Use."

1. Grasp and remove the backup battery shipping insulator to activate the backup battery.
2. Use a small coin or flatblade screwdriver to tighten the end cap screws.

The insulator cannot be reinstalled.

Optional Memory Card

If your hand-held computer came with an uninstalled memory card, make sure it has a battery in it (see the Maintenance section of this manual) before installing the card.

1. Use a small coin or flatblade screwdriver to remove the end cap.
2. Hold the hand-held computer in a vertical position with the end cap opening "up."
3. Gently fit the memory card into the wide slot. Make sure the shutter (figure 8) goes into the slot first, and that the shutter and the display on the hand-held computer are facing the same direction, such as UP or to your left.
4. Allow the memory card to drop into place.
5. Press firmly on the card to seat it inside the computer (you can *feel* it make solid contact).
5. Reinstall the end cap.

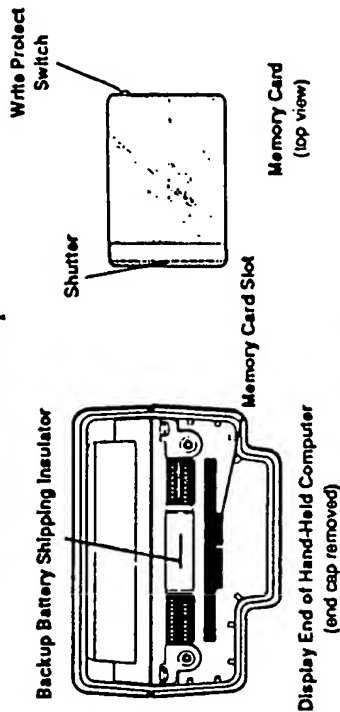


Figure 8
Memory Card Installation

DO NOT OVERTIGHTEN SCREWS

Peripheral End Cap Installation

Use a small coin or flatblade screwdriver to remove the style end cap. Carefully align the two 10-pin connectors on the peripheral end cap to the mating connectors of the hand-held computer; press together gently and tighten both screws.

CONNECTIONS

Surface Connector Electrical Contacts (4000 Series Peripherals)

Connections are made to Norand® 4000 Series peripherals (single dock, multi dock, printer, etc.) via the surface contacts (on the battery-end of the hand-held computer), or the peripheral end cap. In most instances, you will simply slide the hand-held computer into its holder on the peripheral device and contact will be made automatically.

If a retaining or locking mechanism is present on the peripheral device, refer to the device Operator's Guide to learn how to insert and connect your 4000 Series hand-held computer.

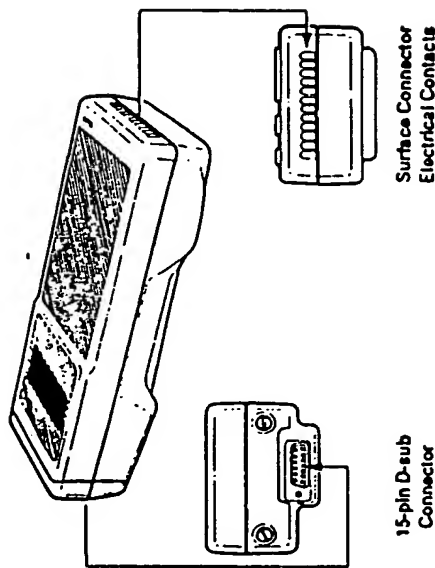


Figure 9
Connectors

Peripheral End Cap

(D-subminiature connector)

The peripheral end cap allows the hand-held computer to be connected to cables or devices having a D-subminiature male connector. Line up the two mating connectors and push them together firmly.

DAILY

ROUTINE OPERATION

Norand® hand-held computers are designed to work with you throughout the day, without special attention. The program (which is designed specifically for your type of business) will guide you in making entries, printing receipts and reports, and in performing other routine tasks.

Battery life is lengthened by operating the hand-held computer while it is connected to a peripheral device that provides charging current. The hand-held computer bypasses its internal batteries (or battery pack) and draws power from the peripheral device.

Here are examples of peripheral devices that provide charging current:

- fixed (van)-mount printer (model 4815)
- multi-dock (model 4960)
- single dock (model 4950)
- selected modems (check modem specifications)

HANDSTRAP

Replacement

You can replace a worn or damaged handstrap using a Phillips screwdriver.

Place the hand-held computer, keyboard/display-side *down*, on a clean work surface. A soft cloth or newspaper can be used to prevent scratches. Notice the two retainer pads.

1. Remove the two Phillips-head screws on each handstrap retainer pad.
2. Pry up on the retainer pads with a flat tool or screwdriver.

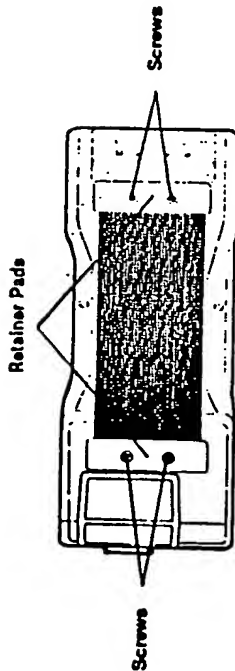


Figure 10
Handstrap Replacement

3. Separate the worn handstrap from the retainer pads.
4. Lay the new handstrap (NPN: 753-962-001) in place on the hand-held computer.
5. Install handstrap retainer pads and Phillips-head screws; tighten them securely.

DO NOT OVER-TIGHTEN SCREWS AS THIS CAN DAMAGE THE CASE.

MEMORY CARD BATTERY

If your hand-held computer is equipped with a memory card, it is advisable to replace the memory card battery approximately every two years. Data stored in the memory card will be lost and must be restored following battery replacement.

Follow the instructions below to change the memory card battery.

1. Remove the end cap from the hand-held computer.
2. Pull the memory card out of the hand-held computer. **Do not use metal tools.**
3. Locate the battery holder – grip it between your thumb and forefinger; pull it out.
4. Observe how the battery is positioned in the holder, then discard the old battery.
5. Place the new battery (NPN: 317-065-001) in the holder; reinstall the battery holder in the memory card.
6. Restore data and reinstall the memory card into the hand-held computer.
7. Reinstall the end cap and resume normal operation.

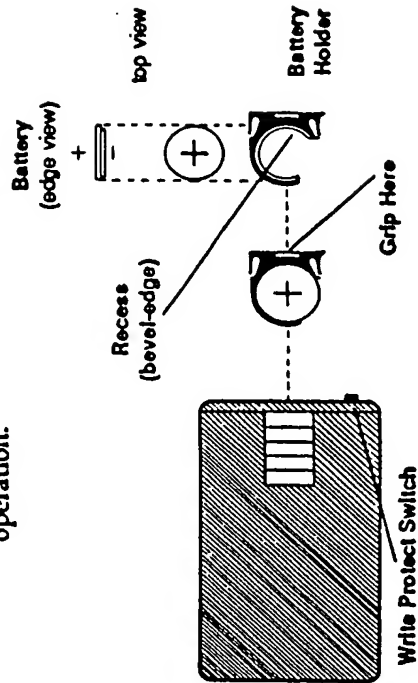


Figure 11
Memory Card Battery

ROUTINE CARE

CLEANING

Periodic cleaning will help maintain the appearance and reliability of the hand-held computer. When cleaning the hand-held computer, inspect the keyboard, handstrap, end cap, battery cover and surface connector electrical contacts, the display, and the entire case for obvious signs of damage, wear, or impending failure.

Clean the exterior of the hand-held computer using a soft cloth dampened with a quality glass cleaner.

D not use solvent solutions.

SPECIFICATIONS

Weight:	1.5 lb
Size:	8.75 inches long, 3.31 inches wide, 1.90 inches high
Temperature operating: storage:	-20 to +60 °C (-4 to +140 °F) -30 to +70 °C (-22 to +158 °F)
Humidity:	90% non condensing
Power source main battery:	AA size alkaline (<i>standard</i>) NiCad battery pack (<i>optional</i>)
backup:	capacitor (all models) lithium battery (<i>models 4400/4410 only</i>)
Charging rate	
0 to +60 °C (+14 to 140 °F):	normal charge
below 0 °C:	trickle charge
Communication interface:	E.I.A. standards RS-232 and RS-485
protocol:	Norand Proprietary Communications Protocol (NPCP)